

Summary

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Methodological News features articles and developments relating to work done within the Methodology division. This issue contains two articles:

- Data visualisation: understanding and conveying information more effectively
- Weekly payroll jobs and earnings methodology

Data visualisation: understanding and conveying information more effectively

Data visualisation: understanding and conveying information more effectively

"The greatest value of a picture is when it forces us to notice what we never expected to see."
John Tukey (1915-2000)

Data visualisation techniques like graphs and diagrams have been used to help us understand data and information for centuries. Good visualisation reveals stories, patterns, clusters, relationships, and anomalies like outliers or missing data, that are not as obvious or are harder to see in table and text format.

In 2020, the COVID-19 pandemic has increased the volume and style of data visualisations that we see every day in the media. Further, in recent times statisticians and data scientists are acquiring and using increasingly complex and large datasets, including administrative and transactions data. These two factors have influenced our data visualisation work program.

Data visualisation is often separated into exploratory and explanatory visualisation. Explanatory work focusses on telling stories with data, conveying information to the audience in clear and appealing ways. In contrast, exploratory visualisation is about making sense of new data sources, understanding what's going on in the data and determining how they could potentially be used in different ways. This assists analysts to assess the content of a new data source, see what's interesting and plan more directed analysis. In some situations, there is overlap between these two types.

Examples of recent data visualisation work in the ABS include:

- exploratory visualisation of a range of new data sources
- designing new visualisations for Merchandise Trade data processing and some specialised reports
- establishing visualisation guidelines for different types of published materials
- exploring visual techniques for interpreting results from complex "black box" analysis methods and models so they're easier to understand and explain (such as complicated machine learning methods)
- creating new types of dynamic graphs for social media. Some dynamic line plots were released in August-September 2020 showing how single touch payroll jobs have changed during the COVID-19 pandemic

Our upcoming work will include:

- exploratory visualisation of a range of new data sources and statistical methods - ABS is always investigating new sources and methods with the aim of reducing burden on survey respondents and providing richer information on the Australian economy and society
- exploring more visual techniques to support effective statistical processing - for example allowing quicker identification of anomalies and confirmation of clean data ready for release

- building ABS capability in different types of data visualisation

For more information, please contact Mary-Anne Stewart at methodology@abs.gov.au.

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Weekly payroll jobs and earnings methodology

Weekly payroll jobs and earnings methodology

The ABS is committed to delivering timely and accurate information about the impacts of the coronavirus (COVID-19) on Australian society and the economy, through producing a range of existing and new statistical products.

The new Weekly Payroll Jobs and Wages in Australia publication is one of these and aims to provide weekly changes in the number of jobs, changes in wages and average weekly wages by jobs at the national, state and territory and industry level by selected personal attributes, including sex and age group. The estimates are compiled using Single Touch Payroll (STP) data provided to the Australian Taxation Office (ATO) by businesses with STP-enabled payroll or accounting software each time the business runs its payroll. Over 99% of large employers (20 or more employees) and 85% of small employers (those with 19 or less employees) are reporting through STP.

The ABS needed to develop methods for imputation, estimation and quality assurance and were assisted by staff from the ATO and the Treasury in compiling the statistics and producing the publication.

The method for deriving weekly estimates from the STP data is based on the method used by the UK Office for National Statistics for producing statistics from similar payroll data. The STP data are reported on a cash basis, i.e., the time when payment was made rather than earned. To produce timely estimates of weekly jobs and earnings, the STP data is converted from a cash basis to an accrual basis. The conversion involves calculating the payment frequency and a daily pay rate for each job. Weekly aggregates are then derived from the daily data.

The STP payment data that are extracted for a specific week cycle are always incomplete due to varying payment and reporting frequencies. For example, a business with a monthly payroll will only provide STP data every fourth week. We developed a method to impute for the missing payment data ensuring that reliable statistics could be produced on a weekly basis. The method assumes that if an employee has not yet had payment data reported and they have not been flagged for termination, their payment status is consistent with their previous reporting record and their previous calculated daily rate is used for the current period. We also developed a strategy for revising estimates when the latest STP data becomes available.

The methods for imputation and treatment of unusual cases was initially kept simple due to the limited development time for the first publication. Several enhancements have since been identified to further improve the measurement quality of labour market changes and reduce the magnitude of the applied revisions. These include adjusting for Fringe Benefit contributions on an accrual basis, adjusting for short-term growth or decline in the pay rate for imputed jobs, incorporating treatments for new jobs, and accounting for irregular payments. These proposed method enhancements are currently being assessed using historical data and will be implemented once proven to be effective and robust.

For more information, please contact Summer Wang at methodology@abs.gov.au.

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How to contact us and email subscriber list

To provide comments or feedback, or to be added to or removed from our electronic mailing list, please email methodology@abs.gov.au or contact:

Methodological News Editor
Methodology Division
Australian Bureau of Statistics
Locked Bag No. 10
Belconnen ACT 2617

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About this Release

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